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BEEF PRODUCTION  
IN THE  
COTTON BELT



**BEEF CATTLE** are unusually well adapted for using the by-products of cotton production, such as stalks, cottonseed meal, and cottonseed hulls, and also legumes grown primarily to enrich the soil.

While beef cattle grown under such conditions need good care, such as plenty of feed, shelter, and protection from diseases, they make a better showing without such care than most classes of livestock. Another advantage is that they require most attention in the winter, which is a slack time for labor on cotton plantations. At other times the little attention necessary can be given when it is too wet for field work.

Most cotton plantations have large acreages of abandoned fields, woodlands, and other unimproved land which, if fenced, and with a few improvements, such as water supply, shelter, brush cutting, and the sowing of seed, would make a valuable source of income.

This bulletin contains information on methods of producing beef in the cotton-growing States. However, everything one needs to know on the subject can not be put into a bulletin of this size. Therefore, it is suggested that the reader obtain other Farmers' Bulletins such as those listed on page 18.

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# BEEF PRODUCTION IN THE COTTON BELT.

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## RAISING BEEF CATTLE IN THE COTTON-GROWING STATES.

THE breaking up of the one-crop system of cotton production by the Mexican boll weevil has done more to force an interest in cattle production in the South than anything else. The great prejudice against southern cattle once held by the killers and feeders of the North is being eliminated by better breeding, feeding, the eradication of ticks, and the much smaller supply of cattle in the United States in proportion to the population.

The chief drawback to beef production is the unfamiliarity of the majority of both landowners and laborers with the best methods of handling cattle and providing good pastures. The men who have devoted most of their energy and capital to developing herds of purebred cattle have had a very poor market for their surplus breeding stock, because practically all available labor, land, and capital have been put into the production of cotton. Other drawbacks, besides the poor market, have been the lack of suitable caretakers and the shortage of good pasture. Good pastures are essential to the successful keeping of beef cattle.

The cotton planter should grow more legumes, such as cowpeas, soy beans, velvet beans, lespedeza, crimson clover, and peanuts in order to maintain and, in many cases, increase the productivity of his soil. These crops make excellent hay for feed as well as improve soil fertility. When such legumes have matured it is unnecessary to plow them under in order to enrich the soil; they may be fed to livestock and the manure applied to the fields. About 80 per cent of the fertilizing value of feeds may be returned to the soil in the

form of manure. Under average conditions liberal applications of manure will increase cotton yields about 25 per cent.

Cattle can be raised in the Cotton Belt most advantageously by using pasture during late spring, summer, and fall and wintering them on the legume hays, such as lespedeza and cowpea, which are grown primarily to enrich the soil along with nonlegume roughages, such as cottonseed hulls, corn stover, silage, and stubble pasturage, and such concentrates as cottonseed meal and velvet beans. Roughages unfit for feeding should be used as bedding. Steers can be fattened successfully by using cottonseed meal and hulls, peanut meal and peanut hay, blackstrap molasses, velvet beans, soy beans, cowpeas, lespedeza, and corn. In feeding legumes grown for soil enrichment the labor of harvesting may often be eliminated by grazing them.

The size of the average farm in the Cotton Belt States in 1919 was 113 acres, of which 48 acres were improved, 31 acres were in woodland, and 34 acres were otherwise unimproved. Very little of the improved land is used for pasture. As there is so much unimproved land on the average farm its capacity for carrying cattle could be increased greatly by the introduction of better pasture plants. Detailed information on pastures and forage crops may be obtained from the United States Department of Agriculture or State agricultural experiment stations.

Excepting the Great Plains country of Texas, the Black Lands, the Mississippi bottoms, and several minor districts, the soils of the Cotton Belt are lacking in lime, phosphates, and other elements of fertility. Since the best cattle and other livestock are generally grown on rich limestone soil, such as the Kentucky blue-grass region, this lack of productivity in the soil should be corrected by growing legumes and by applying other needed elements of productivity whenever they can be secured at a reasonable cost. Cattle may be fed lime and phosphates in the form of steamed bone meal, wood ashes, or finely ground limestone and rock phosphate. A mixture consisting of equal parts, by weight, of ground limestone, acid phosphate, and salt may be used in place of common salt.

Cattle diseases that are prevalent in the South are anthrax, blackleg, Texas fever, contagious abortion, tuberculosis, salt sickness, and loin disease. These diseases are more or less restricted in area; loin disease is confined to Texas, salt sickness to Florida and the Gulf coast, anthrax to Mississippi, Louisiana, Texas, and Arkansas. Blackleg and tuberculosis are not very prevalent and stock owners and livestock sanitary authorities are exercising diligence in preventing their introduction. All the Cotton Belt States have some Texas fever and Texas-fever ticks. The largest areas under quarantine at present are found in Florida, Arkansas, Louisiana, and Texas. South Carolina and Tennessee are practically free of ticks. Much interest is being taken and rapid progress is being made in the eradication of this pest. Copies of the regulations setting forth the conditions of quarantine and defining the quarantine territory may be obtained on application to the Chief of Bureau of Animal Industry, United States Department of Agriculture, Washington, D. C.

The more common parasites are ticks, including Texas-fever ticks, lice, screw worms, warbles, mange mites, stomach worms, hookworms,

nodular worms, liver flukes, tapeworms, and certain other parasites known to scientists but not yet commonly known or recognized by stockmen. For information on diseases and parasites consult the bulletins listed on page 18.

The long summers and usually abundant rainfall give a long growing season for a large variety of pasture plants and cultivated crops. The average time between killing frosts is 210 days. A number of forage crops remain green throughout the winter and make some growth during a part of the winter. The rainfall varies from 25 inches in west-central Texas to 50 inches east of Oklahoma and Texas. On account of the heavy rainfall in winter, the nutritive value of forages, especially legumes, is materially reduced. This must be considered in providing sufficient range to carry cattle through the winter. The winter rains often prevent the advantageous use of winter pastures on cultivated land and also make shelter for young stock necessary.

### **SHELTER AND EQUIPMENT.**

Ordinarily, when the calves are born in the spring very little shelter is necessary. When the cows calve in the fall or winter and are milked shelter is necessary. Sheds are recommended for both wintering and fattening calves.

Equipment for the feeding of steers need not represent a large outlay of money. The feed bunks, sheds, and water supply should be so arranged that the feeding may be performed with as little labor as possible. It is best to have all feed under cover. A shed having space for hay and straw for both feed and bedding in the center, or on one side, and permitting the cattle to eat these roughages under shelter is very desirable.

In providing shelter 25 square feet of floor space should be allowed for each 1,000-pound steer. A steer of that size should also have at least 2 feet of space at the feed bunk. These figures apply to dehorned steers. As horned steers require much more space, it is highly advantageous to have all cattle dehorned before confining them in lot or barn.

Sheds save feed that would otherwise be damaged by rain, and they also protect the manure dropped under them. Sheds are advisable for feeding cattle on poorly drained and heavy soils, as they provide a dry place for the animals to lie down and prevent injury to the land by trampling in wet weather.

On sandy or sandy loam lands the cattle may be fed on the cultivated fields, thereby dropping the manure directly upon the land. The troughs should be moved occasionally, so that the manure may be scattered more uniformly on the land. A windbreak of trees or bushes is valuable for sheltering cattle that are fed in the open.

### **WATER SUPPLY.**

The water supply should be clean and abundant. In many sections water may be supplied by artesian wells. However, such an expense is not justified for a few cattle. When shallow wells, streams, and springs are not dependable a supply may be stored in ponds, which should have a heavy clay bottom to retard seepage as

much as possible. Whenever possible they should be too deep for the cattle to stand in to prevent their becoming foul. Mature cattle require about 10 gallons of water daily per head.

### SILOS FOR STORING SUCCULENT FEEDS.

According to the 1920 census there are at least 9,000 silos in the Cotton Belt States. The use of silos is very important in the production of beef. A silo saves about 40 per cent of the corn crop, which is practically wasted when the corn is gathered and the stalks are left in the field. Sorghum can be converted into a very palatable silage, practically equal to corn silage in feeding value. If it were cut for hay, there would be much risk of not curing it successfully, while it would become woody if left to ripen before cutting. Other crops, such as cowpeas and soy beans, which are often difficult to cure as hay, can be made into silage advantageously, especially when mixed with corn or sorghum either in planting the crops or filling the silo.

One should consider the cost of silos and the machinery for filling them, however, before deciding to feed silage rather than dry fodder, stover, or hay. The advantage of feeding silage may not be sufficient to pay for the labor of putting it up and the interest and depreciation on the investment in a silo and filling equipment, when cheap pasture is available nearly the year round. Moreover, the number of cattle kept should be large enough to eat a layer of silage at least 3 inches thick each day, which is necessary to keep the top from spoiling. Usually silage is most valuable for cows giving milk. It is more valuable for wintering breeding stock and stockers than for fattening steers.

The following table shows the relative number of cattle that may be fed from silos of different diameters when 3 inches of silage are removed daily, allowing 40 pounds of silage per cubic foot:

Inside diameter of silo.	Number of cattle that may be fed allowing—			
	25 pounds daily.	30 pounds daily.	35 pounds daily.	40 pounds daily.
Feet.				
10	31	26	22	19
12	45	37	32	28
14	61	51	44	38
16	80	67	57	50

Years of experimental work at the Indiana Agricultural Experiment Station have placed the feeding value of 1 ton of corn silage as equal to 4.6 bushels of corn and 0.32 ton of red-clover hay.

### IMPROVING THE BREEDING HERD.

The use of scrub bulls for breeding purposes is a wasteful practice. Growthier calves of better quality that will sell for more per pound can be secured by using good purebred beef bulls. Scrub bulls

not only keep their owners' cattle at the lowest scale, but they also degrade the produce of cows which have been graded up by the use of good bulls. The best policy for herd improvement is to breed the cows to the best bull one can afford and replace the poorest cows, the barren ones, and the shy breeders by the best heifers.

A beef bull should be large, deep, wide, straight lined, symmetrical, well muscled, and masculine in appearance (fig. 1). He should have a strong back, deep, wide, well-filled quarters, short legs, well-covered shoulders, a thick, short neck, and a broad, short head with a broad muzzle. If he has a pedigree of pure breeding in addition, he is worth a great deal more, because he is much more likely to get calves which will have his characteristics. In large herds on extensive pastures provide 1 bull for each 20 cows. In small herds on small pastures allow 1 bull for 30. Cows should be bred at as

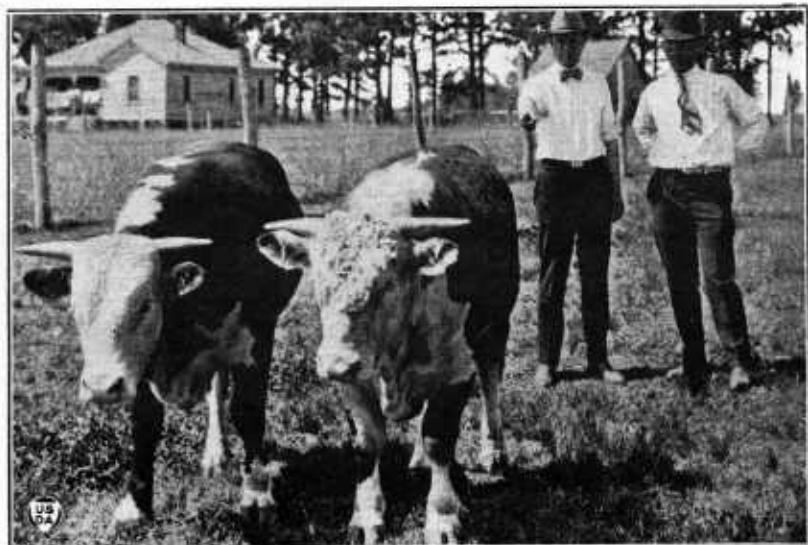


FIG. 1.—Choosing a sire. The bull on the right is the kind that gets the best calves. He is thicker, deeper, lower set, and more masculine.

nearly the same time as practicable, so that the calves will be about the same age, which is a great help in having a uniform lot.

The bull should be the best-cared-for individual in the herd. He should be kept in a separate paddock or lot except during the breeding season. It should be large enough to provide some grazing. The bull should be well fed during all seasons, but especially just previous to the breeding season. A good ration for an 1,800-pound bull is 20 pounds of silage, 20 pounds of legume hay, and 6 pounds of grain. If nonlegume hay is fed, the grain should include about 2 pounds of cottonseed or peanut meal. Large quantities of silage should not be fed to a bull doing heavy service.

Heifers should not be bred until they are about 2 years old. Try to make each generation an improvement over the preceding one (fig. 2). It rarely pays to sell the whole herd and buy new stock, though this may be necessary in case the herd is diseased. In culling

the herd or buying new stock one should keep the best type in mind, whether it be beef or dual-purpose cattle (fig. 4). In either case one should select a large, roomy, vigorous cow with a strong constitution and a gentle disposition. A good beef cow is smooth, well proportioned, and has short legs, a short back, short and broad head, a wide muzzle, glossy hair, and a loose and pliable skin. All cows should have good udders and give enough milk to feed their calves well. Be on the lookout always for shy breeders, contagious abortion, lumpy jaw, and tuberculosis. Beef cows are usually lower set, blockier, more symmetrical, carry more flesh, and have smaller udders than dual-purpose cows.

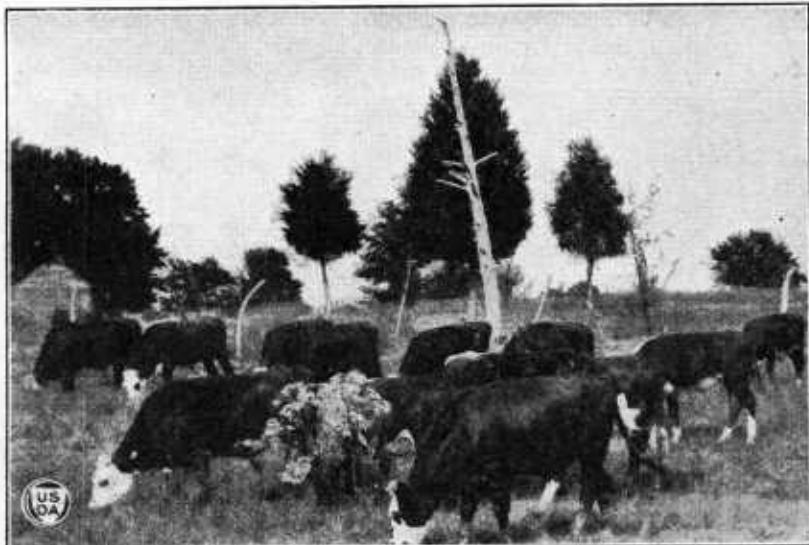


FIG. 2.—A good lot of Cotton Belt steers, showing the effects of good breeding, good pasture, and freedom from Texas-fever ticks. Such steers do well in the feed lot. Good pasture, which means cheap feed, must be available to raise beef cattle successfully.

*Census of purebred beef cattle in Cotton Belt States, 1920.*

State.	Total.	Number of each breed.						
		Aber-deen Angus.	Devon.	Gallo-way.	Herc-ford.	Polled Durham.	Short-horn.	All others.
North Carolina.....	3,085	786	176	.....	933	156	732	302
South Carolina.....	1,680	328	.....	.....	882	36	103	351
Georgia.....	4,397	497	31	35	1,799	226	1,293	516
Florida.....	1,408	577	.....	.....	687	.....	96	48
Tennessee.....	13,319	3,799	.....	.....	4,084	1,334	3,286	816
Alabama.....	4,525	883	.....	.....	1,524	379	1,508	231
Mississippi.....	7,634	2,072	42	.....	2,640	315	1,580	985
Arkansas.....	6,526	835	60	61	1,726	1,388	2,128	280
Louisiana.....	3,083	313	.....	.....	1,340	226	840	364
Oklahoma.....	38,713	1,876	.....	319	12,133	1,217	22,019	1,149
Texas.....	89,743	2,605	.....	530	70,021	5,944	4,371	6,272
Total.....	174,113	14,629	309	945	97,749	11,221	37,956	11,314

**SYSTEMS OF HANDLING CATTLE FOR BEEF.**

There are several systems of handling cows for beef production. Men who have extensive pastures usually follow what is known as the "beef system," in which the cattle are raised for beef alone. While they generally carry the calves through two or three winters and sell them as feeders or grass-fat steers, there is an increasing tendency to sell them at about three months of age. By this practice the cows can be bred sooner and are more likely to produce a good calf the next year. On the other hand, if the calves are well bred it may be better to fatten them as baby beef.

The baby-beef system is adapted to farms where a plentiful supply of fattening feeds is grown and good pasture is available for the summer maintenance of the breeding herd and nursing calves. The cows should receive unusually good care, because it is necessary

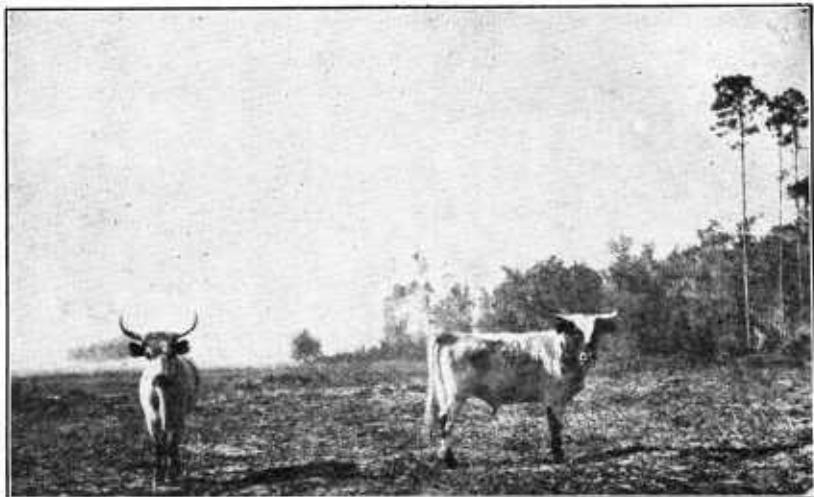


FIG. 3.—Typical Piney Woods steers, the result of letting cattle shift for themselves and breed like wild animals. The time for such methods in the United States has passed. Contrast them with the herd on the title page, which contains an "International" grand champion bull bred in the Cotton Belt.

to give the calves a good start and to grow them as rapidly as possible. Should the pasture become very short, a supplementary feed of silage, hay, or cottonseed cake should be given.

In the dual-purpose system, in which the cattle are raised for both beef and milk, the cows are milked and the calves are raised on part of the whole milk or on skimmed milk and supplemental feeds. About half of the cows of the herd may nurse two calves each and the other half, from which the calves are taken, may be milked.

**HANDLING AND FEEDING COWS.**

The breeding herd may be so handled that either spring or fall calves are raised. When calves are born in the spring they do not require such close attention as fall calves during their first winter. The cows may be wintered more cheaply by using a greater amount

of coarse roughage; less labor is required to handle the calves during the winter and less pasturage is required during the summer, since cows and calves run together.

When calves are dropped in the fall the cows are in better condition at calving time; they give more milk for a longer period; the calves make better use of the grass during their first summer; they escape flies and heat while small, and can be weaned just as the grass is at its best. However, the cows will be much thinner in the spring.

A gestation table follows, by the use of which it is very easy to determine the approximate time a cow will calve when the time of service is known.

*Gestation table for cows (283 days).*

Day of month bred.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Explanation: Find day of month cow was bred in first column and month bred in top line. The date in column below opposite day of month bred will be the time at which the cow is due to calve												
1.....	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1.....	11	11	9	9	8	11	10	11	11	11	11	10
2.....	12	12	10	10	9	12	11	12	12	12	12	11
3.....	13	13	11	11	10	13	12	13	13	13	13	12
4.....	14	14	12	12	11	14	13	14	14	14	14	13
5.....	15	15	13	13	12	15	14	15	15	15	15	14
6.....	16	16	14	14	13	16	15	16	16	16	16	15
7.....	17	17	15	15	14	17	16	17	17	17	17	16
8.....	18	18	16	16	15	18	17	18	18	18	18	17
9.....	19	19	17	17	16	19	18	19	19	19	19	18
10.....	20	20	18	18	17	20	19	20	20	20	20	19
11.....	21	21	19	19	18	21	20	21	21	21	21	20
12.....	22	22	20	20	19	22	21	22	22	22	22	21
13.....	23	23	21	21	20	23	22	23	23	23	23	22
14.....	24	24	22	22	21	24	23	24	24	24	24	23
15.....	25	25	23	23	22	25	24	25	25	25	25	24
16.....	26	26	24	24	23	26	25	26	26	26	26	25
17.....	27	27	25	25	24	27	26	27	27	27	27	26
18.....	28	28	26	26	25	28	27	28	28	28	28	27
19.....	29	29	27	27	26	29	28	29	29	29	29	28
20.....	30	30	28	28	27	30	29	30	30	30	30	29
			Dec.						July.			
21.....	31	1	29	29	28	31	30	31	1	31	31	30
			Nov.			Mar.	Apr.	May	June			
22.....	1	2	30	30	1	1	1	1	2	1	1	1
23.....	2	3	31	31	2	2	2	2	3	2	2	2
			Jan.	Feb.								
24.....	3	4	1	1	3	3	3	3	4	3	3	3
25.....	4	5	2	2	4	4	4	4	5	4	4	4
26.....	5	6	3	3	5	5	5	5	6	5	5	5
27.....	6	7	4	4	6	6	6	6	7	6	6	6
28.....	7	8	5	5	7	7	7	7	8	7	7	7
29.....	8	.....	6	6	8	8	8	8	9	8	8	8
30.....	9	.....	7	7	9	9	9	9	10	9	9	9
31.....	10	.....	8	.....	10	.....	10	10	.....	10	.....	10

The following rations suggested for cows are per 1,000 pounds of live weight and are only for the maintenance of dry cows. Cows that are producing milk should have considerably more concentrates. It is very important to see that they are well fed during the early spring when the grass is watery. This is especially true of cows bringing calves. The calves should have a good supply of milk to make them grow before flies and hot weather come. Dual-purpose cows kept for milk as well as those nursing calves should be fed as dairy cows for best results. Cows that are milked should receive 1 pound of concentrate for every 3 to 4 pounds of milk produced.

RATION 1.		RATION 3.	
	Pounds.		Pounds.
Sorghum or corn silage	40	Sorghum or corn silage	35
Velvet beans	2	Cottonseed hulls	10
Lespedeza or pea-vine hay	5	Cottonseed meal	1 $\frac{1}{2}$

RATION 2.		RATION 4.	
	Pounds.		Pounds.
Cowpea hay	5	Stover or coarse hay	25
Silage	40	Cottonseed cake	2

### THE CALF AT BIRTH AND AFTER.

If the cows are in a vigorous and healthy condition at time of calving they will need little, if any, assistance. However, many calves may be saved by a little attention at birth. As soon as the calf is born, the fetal membrane should be removed from its nose and mouth. Unless the calf is strong and vigorous, insert a finger into the mouth and give the tongue a slight pull. Pressure on the ribs may be necessary sometimes to stimulate breathing. Later, the calf may need some assistance to find the udder. The calf should get the first milk, which acts as a mild purgative, unless the cow's udder is feverish. Use a little pine tar on the navel to avoid screw-worm infection. It is often necessary to milk the cows until the calves can take all the milk.

Early spring bull calves should be castrated as soon as possible after they are dropped, using pine tar as a fly repellent. Late calves should not be castrated until after weaning time, or during cold weather. Calves may be dehorned with caustic potash very early, at 4 to 10 days of age, with less injury than at any other time. Otherwise, it should be done with a dehorning clipper or saw during cold weather.

All calves should be taught to eat grain and hay so that they will not lose flesh when they are weaned.

### BEST AGE AND CONDITION AT WHICH TO MARKET CATTLE.

The best age at which to sell cattle may be judged from the following discussion. Usually, when one has an abundance of pasture and cheap roughage but only a limited quantity of fattening feeds, it is advisable to sell the cattle as stockers or feeders, but for those who can produce the feed finishing them is preferable.

At least three points may be urged in favor of fattening cattle as calves: First, more breeding animals can be kept on a farm when the offspring are disposed of at an early age than when they are retained until maturity; second, the money invested is turned more rapidly when the animals are sold young; third, calves will produce more gains for each 100 pounds of feed consumed than older cattle. As the younger animals grow as well as fatten they use a smaller percentage of their feed for maintenance than the older ones. Mature cattle require from 9 to 11 pounds of digestible nutrients, depending upon the feeds used in the ration, to make a pound of gain, whereas yearlings require 6 to 8 pounds and calves only 4 to 6 pounds. Calves must have considerable quality and breeding in order to fatten satisfactorily. Then, too, more care and skill must

be exercised in feeding young animals than old ones. Calves will not grow and fatten with any degree of satisfaction under a careless system of feeding and management. One case of overfeeding will often put the stomach and bowels out of condition for weeks.

As growth ceases, more of the feed above that required for maintenance goes toward fat formation. Older cattle, therefore, fatten in a much shorter time. Mature feeders fatten in 3 to 4 months, 2-year-olds in 5 to 7 months, yearlings in 8 to 10 months, and calves in 10 to 12 months.

Older cattle can utilize large quantities of roughages which otherwise might be wasted and require less shelter than calves. Three or four months' difference in age means considerable difference in size with young cattle, but relatively little with the older ones. Older cattle usually finish more uniformly.

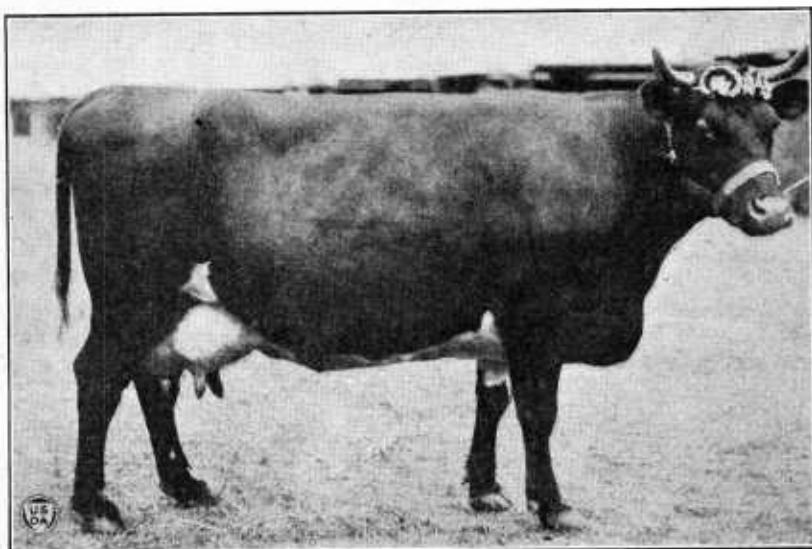


FIG. 4.—An excellent type of dual-purpose cow. Note the depth, straight top and bottom lines, well-developed udder, and general beefiness.

### WINTERING CALVES AS STOCKERS.

The following rations are satisfactory for wintering calves as stockers:

RATION 1.		Pounds.	RATION 3.		Pounds.
Silage	15		Silage	15	
Soy-bean or cowpea hay	4		Pea-vine hay	10	
RATION 2.			RATION 4.		
Silage	10		Lespedeza or pea-vine hay	10	
Lespedeza hay	3		Grass hay	5	
Cottonseed meal	1		Peanut meal	1	
Stover	3				

The rations for stocker calves may be used for yearling stockers by increasing the quantity of roughage about one-half. Two-year-olds may be wintered on the same rations as calves by doubling the quantities of roughages. One should keep in mind that as they get older they can use coarser roughages.

Calves and yearlings should gain about 50 pounds per head in weight during the winter. Two and 3-year-olds should not lose weight. When they do gain in weight during the winter they weigh more in fall than steers which lose in weight during the winter. Stockers are not profitable when growth is stopped. Winter gains are especially valuable when the cattle are to be marketed early in the summer.

### FATTENING CALVES.

When calves are intended for baby beef they should be started on some grain when from 4 to 6 weeks old. A mixture of equal parts, by weight, of shelled corn, whole oats, and wheat bran is satisfactory. The corn and oats may be fed ground until the calves become accustomed to eating. Whole corn and oats are less likely to cause scours. The grain allowance should be increased gradually up to weaning time. Then keep spring calves on full feed all winter and finish them early in the spring to avoid the heat and flies. Fall calves should be weaned after they have been placed on pasture in the spring. A gradually increasing allowance of grain should be given them, with hay and silage added later in the summer. They may be marketed at the end of the pasture season, or put into a dry lot for finishing and marketing in December or January.

Whenever possible, calves should be fattened on corn with legume hay, velvet beans, peanut meal, soy-bean meal or linseed meal to furnish protein instead of cottonseed meal. Overfeeding on cottonseed meal produces poisonous effects which are often not apparent for some time. Generally corn produces better finish than cottonseed meal, as cottonseed meal promotes growth rather than fattening.

The following rations may be used as the average amount of feed per head per day for calves weighing 450 to 500 pounds which are to be finished for baby beef. The rations may be adjusted to suit local conditions by substituting one or more local or home-grown feeds for feeds of the same general character included in the rations as outlined.

RATION 1.		RATION 3.	
	Pounds.		Pounds.
Cowpea hay -----	10	Corn -----	5
Shelled corn -----	6	Molasses -----	2
Peanut meal -----	3	Peanut meal -----	2
Coarse hay -----	Unlimited.	Mixed hay -----	Unlimited.

RATION 2.		RATION 4.	
Silage -----	8	Silage -----	10
Corn-and-cob meal -----	15	Cottonseed meal -----	2
Lespedeza or soy-bean hay-----	4	Velvet beans (soaked) -----	4
Peanut meal -----	2	Shelled corn -----	8

## FATTENING STEERS.

To obtain the most satisfactory results cattle should be raised on the farm where they are fattened. However, it is often necessary to buy feeders if the farm is small, the pasture too limited, or the land too high in price to raise them. By purchasing feeds such as cottonseed meal to supplement home-grown roughages and fattening steers the productivity of the land may be built up faster than by keeping a breeding herd.

Cattle feeders should study the demands of the market for certain seasons and feed the kind of cattle that will be in demand when they are ready for market. In some seasons certain weights and classes of cattle may be purchased more economically than others. Ordinarily it is preferable to buy the cattle in early fall, as competition between packers and feeders usually increases as winter approaches. Cattle intended for fattening on grass the following summer should

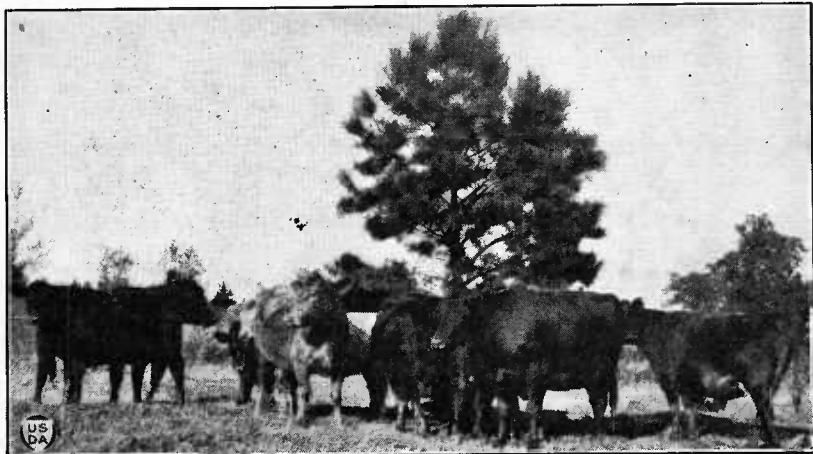


FIG. 5.—These cattle are the products of crossing good beef bulls with scrub cows. It pays to use such bulls.

be purchased in the fall if there is plenty of cheap roughages on hand. Oftentimes feeders can be bought in the country, either locally or in producing sections, such as Texas and the Ozarks and Appalachian Mountains, to better advantage than at the public stockyards.

High-grade steers will not make larger gains or more gain in proportion to the feed consumed, but will make more economical use of it in the way of laying on flesh in the regions of the valuable cuts. Well-bred steers also dress out more than scrub steers. One should keep these facts in mind, but not be influenced to such a degree as always to buy the highest-priced feeders. Fleshy feeders usually cost more money and make smaller gains than thin feeders. However, on extremely short feeds and when prospects are good for higher prices they can often be used to advantage.

## HOGS FOLLOWING CATTLE.

Cattle that are being fattened usually receive so large a proportion of concentrates that considerable feed is voided in the manure,

especially when corn or velvet beans are fed. Old cattle pass more undigested feed into the manure than young cattle. Also, the waste feed is considerably greater when whole grain is used than when the grain is ground. Ordinarily one pig weighing 70 to 80 pounds to each three steers will be required. Two-year-old steers on a full feed of shelled corn should have one pig each. When supplemental feed is given the pigs, a few more pigs may just as well be added. If only enough hogs are kept to follow the cattle in the feed lot, the cattle pastures need not be fenced hog tight, as a much smaller area devoted to good pasture and properly fenced will furnish sufficient hog pasture for this part of the enterprise.

#### COTTONSEED MEAL FOR FATTENING.

It is well known that the feeding of large quantities of cottonseed meal will poison cattle. However, the meal is not so harmful to older cattle as it is to young cattle. Mature steers may be fed about 1 pound of cottonseed meal per 100 pounds live weight daily for about 100 days without harmful effect. With silage it may be fed longer. In fact, it is better always to feed it with a laxative feed, such as silage and legume hay. One pound of cottonseed meal is practically equal to 2 pounds of corn or velvet beans and to 1.3 pounds of cold-pressed cottonseed cake for fattening steers.

#### VELVET BEANS FATTEN STEERS SATISFACTORILY.

Velvet beans alone may be used for fattening steers. When steers do not eat them readily, sprinkle cottonseed meal over them at the rate of 1 pound or more per steer per day. Dry, whole velvet beans are more palatable and economical for fattening steers than either soaked or ground velvet beans. They are very difficult to grind and the meal heats, becomes rancid, and molds readily.

When velvet beans are pastured by fattening cattle fence off areas of such size as will be cleaned up in about a week or 10 days. The areas should be increased as the time for marketing approaches. This method involves leaving more and more feed in each successive area used, which can be utilized economically by turning in cows or stockers and hogs.

#### ROUGHAGES.

The daily gains made by steers fed on silage are usually greater than when cottonseed hulls are used, and the amount of concentrates required to make 100 pounds of gain is smaller, especially after the first 60 days. Silage-fed steers finish better and more quickly than those fed on hulls; they dress a larger percentage of marketable meat and usually make greater profits.

Under average conditions the greater the proportion of silage to concentrates in a fattening cattle ration the more economical the gains. The greater the quantity of concentrates in a ration the less the silage consumption.

Corn stover when used as the sole roughage for fattening steers is not entirely satisfactory. Steers will not consume as much of it as they should and do not finish so well as steers which have been fed

on cottonseed hulls or corn silage. However, stover may be so much cheaper than hulls that it is preferable from the standpoint of economy. When it is used with clover, alfalfa hay, or corn silage it is quite satisfactory. Stover can be used to best advantage by the breeding herd and stockers. Sorghum fodder is not equal to cottonseed hulls for putting gains on cattle.

#### INCREASE THE FEED GRADUALLY.

Gradual increases in the quantities of feed in the ration are essential to success in getting steers to consume the maximum quantities of feed. The object of this is to get the most rapid gains, which are the most economical, because the proportion of the feed consumed which is used for maintenance is reduced to the minimum. Aged cattle can be put on full feed more quickly than calves.

When 2-year-old steers are to be fed for 4 months, a good practice is to put them on full feed in about 30 days. They can be handled safely as follows: Start with 1 pound of cottonseed meal a day and increase by half a pound a day until 4 pounds is reached. Hold at this point for four days. Then increase half a pound every three days until about 8 pounds per steer daily is reached. In feeding velvet beans or corn the quantity started with and the rate of increase for cottonseed meal may be doubled. They may receive all the roughage they are able to consume from the beginning without any ill effects.

#### FULL FEED RATIONS FOR FATTENING STEERS.

Since steers that are fattened vary so much in weight, the rations given below are for steers averaging 1,000 pounds. Due allowance must be made for smaller or larger animals. If steers average 700 pounds per head, the quantities should be seven-tenths as much; if they weigh 1,200, increase the quantities by one-fifth. Similar feeds may be substituted. The steers should be gradually brought up to these quantities of feed in about 30 days. Do not expect steers to eat such quantities exactly. They may eat a few pounds more or less, varying with the capacity of their digestive organs, their appetites, the kind of feed they have been used to, the climate, and the palatability of the feed.

When steers are on full feed great care is needed to see that they are not overfed, as a very small quantity of concentrated feed in excess may derange the digestive system so that they will not eat nearly so much and will stop putting on gain. Concentrates, such as meal, beans, and corn, should be fed in just such quantities as they clean up. Let them be ready to eat just a little more after cleaning up each feed. One should decrease the feed when hot, muggy weather comes and increase it when the weather is cooler and drier. While an excess of roughage is not likely to hurt the steers, it is best to feed just what they will clean up readily at each feed. These quantities may vary considerably, as one can not use an exact formula in feeding cattle. Feed left over usually loses considerably in palatability and may not be eaten at all.

RATION 1.		RATION 4.	
	Pounds.		Pounds.
Grass (nonlegume), hay, hulls, or stover	25	Grass hay or hulls	25
Cottonseed meal	10	Cottonseed meal	5
RATION 2.		RATION 5.	
Silage	55	Silage	45
Cottonseed meal	10	Velvet beans	12
RATION 3.		RATION 6.	
Silage	35	Lespedeza or cowpea hay	25
Corn	10	Cottonseed meal	4
Cottonseed meal	5		
Grass hay or hulls	4		

Generally, the concentrates should be gradually increased as the feeding period advances and the roughages should be decreased. Cattle need salt conveniently located all the time. They will consume daily approximately 1 ounce of salt per 1,000 pounds live weight.

#### PASTURE IS THE CHEAPEST FEED.

Pastures are the cheapest feed for cattle and should be utilized for fattening whenever possible. The use of cottonseed cake at the rate of 3 to 5 pounds per head daily in addition to the grass is often more profitable than grass alone. Larger and more expensive gains are obtained when cake is fed. However, the cake-fed steers usually sell for enough more to make a profit on the cake. They produce better carcasses and a higher percentage of desirable meat than steers fattened on pasture alone. Moreover, the use of cake enables one to finish the cattle sooner and get them on an earlier market, which usually results in a higher price and gives the pasture a chance to reseed and to make some winter pasture.

If cattle are started on feed late in winter or early in spring, they may be turned on pasture after grass has made a good growth, in which case grass should be supplemented with concentrates. If a heavy feed of silage has been fed in a ration, cattle on full feed may be turned on grass with no serious effects from scouring as a result of the change from silage to grass. But cattle on a full ration of dry feeds scour when first turned on grass and may lose more than the benefits derived from the grass. Scant pastures should never be used for finishing cattle under any condition.

#### ITEMS OF COST IN FATTENING STEERS.

In fattening steers the operating expenses usually more than equal the original price of the feeders. The factors considered in operating expense are feed, labor, building and equipment, interest, marketing, insurance, and taxes. Feed usually constitutes about 80 per cent of the operating expense, so that the other factors combined make up about 20 per cent. All items of expense other than feed are usually balanced by the manure and pork credits.

Labor can be reduced only by use of labor-saving devices and by having a convenient arrangement of equipment, so that the actual feeding operation will take as little time as possible. Feed bunks conveniently arranged, feed carriers from silo or cribs to the bunks, and all roughage and bedding placed in a shed convenient to the other equipment are factors which should influence this labor charge.

Interest is usually figured only on the purchase price of the cattle. Insurance amounts to very little. The items of death risk and veterinary charges are included under insurance.

The cost of marketing depends largely upon the distance from market, as the freight charge is usually the largest item of expense. It includes other items, such as bedding and loading, feed in transit and in yards, yardage, terminal charge, commission, and expenses of the person accompanying the cattle to market.

### SHRINKAGE AND SHIPPING TO MARKET.

Shrinkage, often called drift, is the loss of a normal fill of feed and water, due to the excitement and inconveniences for feeding and watering in moving cattle from the farm to market. Theoretically, the greater the shrinkage the more the cattle should bring per pound, because shrinkage increases the dressing per cent. When cattle are sold by dressed weight, as in some foreign countries, shrinkage in transit is not a cause of loss in marketing. However, in our markets buyers expect cattle to have a certain fill and do not usually make allowance for an excessive shrinkage. This often results in a loss of money to the seller when he should have had a profit. Shrinkage usually varies from 3 to 5 per cent of the weight, depending upon the shipping distance and the way the cattle are fed just prior to shipment.

Shrinkage in transit can be kept low by proper feeding of the cattle during the 48 hours before shipping. Such feeds as silage, legume hay, and concentrates should be decreased about half during the last day of feeding. Any unusually laxative feeds should be eliminated. Cottonseed hulls, Johnson-grass hay, or a similar roughage should be supplied in unlimited amounts. Oats can be substituted for half the corn ration the last two days with good results. Molasses or any other sweet feed can be continued until shipping time without bad effects.

It is bad practice to keep salt away from the cattle for some time and then salt them heavily just before shipping. It may cause scouring while in transit, with resulting loss to the shipper. Cattle should receive their normal supply of water until possibly a few hours before shipping.

In being driven to the station cattle see strange objects and are frightened very easily. Hence, plenty of help is very valuable in keeping the drove together. They should be driven with as little noise as possible.

Bedding is not intended to furnish a comfortable place for the cattle to lie down, but to furnish good footing for them in order to prevent slipping. Cattle well bedded come out of the car clean, which is attractive to the buyer.

It is important that the car be loaded to as near the minimum weight capacity of 22,000 pounds as practicable, since the freight rate

is applied to the minimum capacity of the car, whether the weight of cattle is there or not. Avoid mixed shipments, if possible; that is, mixing hogs or sheep with cattle, since in such cases the hog or sheep rate, which is higher than that for cattle, is applied to the minimum weight for cattle. Have the space so well utilized that the cattle are "snug." Unused space increases the danger of injury.

### SAVING MANURE FOR GREATER RETURNS.

The manure must be put back on the land with very little loss in order to make the keeping of cattle show any considerable profit. On rolling land the loss by leaching is much greater when the ground is bare or the grass very closely grazed than where there is a considerable growth of vegetation.

While well-drained lots are a great convenience in wet weather they may facilitate the escape of most of the liquid manure and the soluble parts of the droppings. On land which is level or has only a slight slope not much is lost by surface drainage from open, unpaved lots, but much manure may soak in and be trampled into the mud and so can not be distributed over the fields where it is needed. To avoid this lots may be paved and even surrounded by a low wall to prevent any loss. Where this is not practicable or too expensive the cattle to be fattened may be confined under a shed or in a barn and be so well bedded that the liquid manure is absorbed by the bedding. Manure handled thus may be allowed to become several feet deep without heating or any loss in value. In fact, as it decomposes it becomes easier to handle in removing and spreading on the fields. When it is allowed to accumulate thus the feed bunks should be so built that they can be raised as the level of the manure raises. The lower part of the shed or barn wall, and fences where open sheds are used, should be very strong to hold the manure which is being continually packed by the cattle. Cattle thus confined usually do not make quite so good gains as those which are allowed open air, but the saving of manure may overbalance this difference in gains. As a 1,200-pound steer will produce about 60 pounds of liquid and solid manure per day, and as about two-thirds of it is lost if the feeding is done in open lots, 2 tons of manure per steer would be lost in a 100-day feeding period.

In case the manure is cleaned out often and can not be spread immediately upon the fields it should be stored in a water-tight pit, preferably one which is covered.

Cattle not being fattened and which are kept up for feed and shelter should be allowed the freedom of a field or pasture when weather and soil conditions permit and thus save the expense of storing and spreading their manure.

### APPARENT LOSSES VERSUS REAL PROGRESS.

Many so-called losses are classed as such because in calculating results top market prices for the year were not received for the crops that were fed to the cattle. Feeds can not fairly be charged at the top prices for the year, as comparatively few farmers are fortunate enough to dispose of their crops at the period of highest prices. The man who feeds cattle is marketing his crops as he feeds them, and

therefore is justified in expecting a return equivalent to average market prices for the feeds. On the average for a long period of years, the man who feeds his cattle and puts the manure back on the land is the one who comes out ahead in the end.

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October 3, 1928.

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